

1) Write as a single power, then evaluate.

a.  $4^7 \div 4 =$

b.  $\frac{7^5}{7^2} =$

c.  $3^8 \div (3^2)^3 =$

d.  $9^5 \times \frac{9^3}{9} =$

2) Find the value of  $x$ .

a.  $3^5 \times 3^x = 3^{10}$

b.  $5^8 \div 5^x = 5$

c.  $(6^4)^x = 6^{12}$

d.  $2^x \times 2^4 = 2^5$

3) Which is true? Do not use a calculator.

a.  $3^4 + 3^5 = 3^9$

b.  $3^3 \times 3^4 = 3^{12}$

c.  $3^{10} \div 3^2 = 3^5$

d.  $3^5 \div 3^3 = 3^2$

6) Write as a single power then evaluate:

a.  $((-4.5)^2)^3$

b.  $(3.2)^3(3.2)^6$

c.  $\frac{(-7)^9}{(-7)^7}$

d.  $\frac{1.8^5}{(1.8^2)^2}$

7) Is each statement true or false? Correct the false statements. Do not use calculators.

a.  $6(-2)^3 = 48$

b.  $(-a)^4 \div (-a)^2 = a^2$

c.  $(-5)^3 \div (-5)^2 = 5$

d.  $y^2 \times y^4 = y^6$

8) Evaluate for  $s = -2$  and  $t = -4$ .

a.  $-3st$

b.  $-2s^2 - 5t$

c.  $\sqrt{-t} + s^3$

d.  $3s^4 + \frac{8}{t^2}$

12) Explain the error in each case and correct it.

a.  $(-8x^2y^2)^2 = -64x^4y^4$

b.  $(5a)(3a) = 15a$

c.  $(3p^2q^5)^6 = 9p^8q^{11}$

17) Evaluate without calculators. Give exact answers as reduced fractions or integers.

a.  $4^{-3}$

b.  $(-3)^{-2}$

c.  $2^0 - 2^{-2}$

d.  $8^4 \div 8^6 \times 8$

18) Simplify. Write as a single power with a positive exponent.

a.  $t^3 \times t^{-5}$

b.  $(c^2)^{-2} \div c$

c.  $y^{-5} \times y^3 \div y^{-8}$

d.  $a^{-2} \div (a^{-4})^{-1}$

**19)** Find the missing value of  $y$ .

a.  $5^y \times 5^9 \div 5^2 = 1$       b.  $(-y)^{-3} = -\frac{1}{1000}$       c.  $-5^2 \times 5^{-2} = y$       d.  $\frac{(-5)^y}{(-2)^2} = \frac{1}{4}$

**20)** Evaluate. Leave answers as reduced fractions. Hint: write fractions as division!

a.  $\frac{1}{4^{-1}} + \frac{1}{2^{-1}}$       b.  $\frac{3^{-1}}{6^{-1}}$       c.  $-\frac{2^{-3}}{7^{-1}}$       d.  $\frac{-2^3}{3^{-2}}$

**21)** Evaluate. Give exact answers as reduced fractions. Hint: watch for common bases!

a.  $\left(\frac{3}{4}\right)^{-1}$       b.  $\left(\frac{-4}{5}\right)^{-2}$       c.  $\left(\frac{1}{2}\right)^{-3} \times 2^{-4}$       d.  $\left(\frac{3}{7}\right)^5 \left(\frac{3}{7}\right)^{-7}$

Use laws of exponents and simplify. Write your answers in positive exponents.

1) $\left(\frac{x^7y^3}{x^2y}\right)^4$	2) $(a^3b)^4(ab^6)^2$	3) $\left(\frac{8m^5n^7}{2mn^5}\right)^3$
4) $(5p^3q^2)(2p^4q)^2$	5) $\frac{(8k^{-5})(2k^3)}{4k^{-6}}$	6) $(b^{-3}c^{-7})^{-2}(b^3c^{-2})^0$
7) $\left(\frac{6lm^2}{3l^3m^6}\right)^2$	8) $\left(\frac{2r^{-5}s^6}{r^3s^4}\right)(3r^9s^{-4})$	9) $(u^{-3}v^5)\left(\frac{9u^{-5}v^2}{3u^6v^{-8}}\right)$
10) $\frac{8v^5w^{-6}}{(2v^{-3}w^2)(v^6w)}$	11) $\left(\frac{3s^{-2}t^7}{6s^3t^{-5}}\right)^{-4}$	12) $(3l^{-2}m^3)(2m^{-5})^2(lm^4)^{-3}$
13) $(4u^2v)^{-3}(u^{-5}v^6)^2(u^{-8}w^{-9})$	14) $\left(\frac{6x^{-3}y^5}{2xy^2z^6}\right)^5$	15) $\frac{(2a^{-3}b)(6b^5c^{-7})}{4c^{-9}}$